

**Off-Hugoniot shock compression of Zirconium probed at the microstructural and nanosecond scales with *in situ* x-ray diffraction.**

Patricia Kalita, **Justin Brown**, Paul Specht, Seth Root

Sandia National Laboratories, Albuquerque, NM, 87185

Melanie White, Andrew Cornelius

High Pressure Science and Engineering Center, University of Nevada Las Vegas, Las Vegas NV 89154

Jesse Smith

High-Pressure Collaborative Access Team, Argonne national Laboratory, Argonne, IL 60439

Zirconium, a group-IV transition metal, has fascinated the extreme pressure community since 1952, when Bridgman first inferred a phase transition while measuring resistance under pressure. We present results of off-Hugoniot shock compression of Zirconium probed at the microstructural and nanosecond scales with *in situ* x-ray diffraction. We also demonstrate how x-ray diffraction combined with static compression in the same pressure and temperature space can help to create an integrated picture of behavior of Zirconium under extreme conditions.

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